

## A case of intravesical knotting of a feeding tube used as a urethral catheter

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A five month old infant presented to the paediatric ward with absent urine output for fourteen hours. He also had fever and inconsolable crying over the preceding eight hours. He was small for gestational age baby born at term. He has not suffered from any significant medical illness. His growth and development were age appropriate. On admission, he was noted to be febrile and irritable. The systemic examination was unremarkable. A clinical diagnosis of sepsis was made and it was decided to proceed with a partial septic screen. Commencing of antibiotics was delayed for several hours as the mother failed to collect the urine for culture. Therefore it was decided to perform an in and out urethral catheterization to collect the urine sample. A feeding tube (FG 5) was inserted under strict aseptic conditions and 10ml of urine were obtained. Repeated attempts to withdraw the feeding tube were unsuccessful. Supine abdominal x-ray was done which showed the knotted feeding tube in the bladder (Figure 1).

The child was transferred to the Lady Ridgeway Hospital for further surgical management. A cystoscopy was performed under general anaesthesia which demonstrated the kinked feeding tube inside the bladder. The feeding tube was removed after de-knotting. The anatomy of bladder was normal.

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### Discussion

Obtaining a sterile urine sample for culture prior to administering antibiotics is a challenge in a very sick young child. In 2011, the American Academy of Paediatrics (AAP) recommended that urine cultures be collected by supra-pubic aspiration (SPA) or urethral catheterization for the diagnosis of urinary tract infection<sup>1</sup>. For years, SPA of urine was considered the standard method for obtaining urine. However, success rates for obtaining the sample is reported to be low (23%–90%). With ultrasonographic guidance, success rates have improved. The procedure has its own risks and requires technical expertise. Urine obtained through catheterization for culture has a sensitivity of 95% and a specificity of 99%<sup>1</sup>.



Figure 1: Supine abdominal x-ray showing knotted feeding tube in bladder

Urethral catheterization is also performed to relieve urinary retention in the neurologically impaired, to monitor fluid balance in the critically ill, and for radiological evaluation of the lower genitourinary tract. Feeding tubes are used most commonly in infants compared to catheters as they are more rigid, freely available and cost effective. Small feeding tubes (size 5FG or 8FG) are frequently used for routine catheterization in the outpatient settings in small, young children<sup>2</sup>. Intravesicular catheter knotting is an infrequently reported complication. Incidence is 0.2 per 100,000 population<sup>2</sup>. Although this complication is rare, it can involve significant morbidity. Awareness of this complication is low among paediatric medical staff due to the relative rarity of this complication. The risk of intravesicular catheter knotting may be reduced with proper technique and using the appropriate sized catheters for age<sup>2</sup>. It has been hypothesized that the urethral catheter becomes knotted and forms a loop if an excessive length of flexible catheter is inserted into the bladder. Subsequently, when the catheter is withdrawn, the knot can get tightened. Although knotting is rare, removal involves significant risks and complications, such as undergoing general anaesthesia, radiation exposure during fluoroscopy, and transient haematuria. Potential for further complications such as urethral trauma, urinary incontinence and stricture formation also needs to be considered. The tendency of a catheter to knot probably depends on its flexibility, smaller diameter and redundancy within the bladder. Catheters more slender than 10 Fr, over-distended bladder and insertion of excessive length of catheters must be considered as risk factors for catheter knotting<sup>3</sup>.

In view of the potential for morbidity and complications, we recommend the following:

1. Avoid, if possible, the use of flexible feeding tubes as their rigid and longer nature increase the risk of trauma and knotting.
2. Insert catheters of appropriate size for age and insert only as far as necessary to obtain a urine flow<sup>3</sup>. Carlson and Mowery recommend the insertion length of 6 cm in a male newborn and 5 cm in a female newborn<sup>4</sup>. In low birth weight babies they recommend use of size 4 Fr catheters (like umbilical artery catheter). In extremely premature babies with birth weight of <750g insertion length of <2.5 cm in girls and <5 cm in boys is recommended<sup>4</sup>.

3. Remove the catheter as soon as possible or tape it securely to prevent advancement if it is to be used subsequently for fluid monitoring.
4. Slow and steady removal of catheter is recommended after completion of the procedure

Urethral catheterization to obtain urine for culture is a procedure that will likely become more frequent. It is important that clinicians are alert to this rare but potentially preventable adverse event, and use proper technique and catheters to minimize the risk of its occurrences.

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